

and multicarrier RF section 730. The MIMO-based UWB modulation and multicarrier RF section 730 is connected with four antennas ~~[[of]]~~ from 160a to 160d. An UWB control processor 740 is used to control a frame information and ~~control~~ entire process among the units of the MIMO-based UWB base station 170, the MIMO-based UWB spreading and filtering 720, and MIMO-based UWB modulation and multicarrier RF section 730.

Page 16, in the detailed description section, the ~~second~~ ^{third} paragraph (extends to the page 18), replace with the following new paragraph:

--- Referring to FIG. 8 is a detailed block diagram 800 of showing the UWB baseband processor 710 according to some embodiments. There are a number of p users ~~[[with]]~~ from a user-1 bitstream 810a to a user- p bitstream 810p, respectively. The user-1 bitstream 810a is coupled to a 1/2-rate convolution encoder 812a ~~in which~~ that is connected to an interleaver 814a. Using a unique PN sequence of a user-1 key 822a spreads the output sequence of the interleaver 814a. In a similar way, the user- p bitstream 810p is coupled to the 1/2-rate convolution encoder 812p that is connected to the interleaver 814p. Using the unique PN sequence of the user- p key 822p spreads the output sequences of the interleaver 814p. All of the PN sequences of the user-1 key 822a to the user- p key 822p are orthogonal each other. This means that a cross-correlation between one PN sequence and other PN sequences is almost zero, while a self-correlation of a user PN sequence is almost equal to one. Then, the p output sequences from the interleaver 814a to the interleaver 814p in a parallel operation are added together to form a serial sequence output by using a sum over block duration 830. The serial output of the sum over block duration 830 is converted into four parallel sequences by using a polyphase-based multiband 840. Thus, the first of the output sequence from the polyphase-based multiband 840 is converted into a 512-parallel